

INTERACTION EFFECTS BETWEEN MATERNAL PRENATAL VITAMIN INTAKE AND PYRETHROID PESTICIDE EXPOSURE IN RELATION TO AUTISM SPECTRUM DISORDERS IN THE CHARGE CASE-CONTROL STUDY

Rebecca J. Schmidt, *University of California Davis, USA*

Lora Delwiche, *University of California Davis, USA*

Robin L. Hansen, *University of California Davis, USA*

Irva Hertz-Picciotto, *University of California Davis, USA*

Background and Aims: Autism spectrum disorder (ASD) is an increasingly prevalent neurodevelopmental disorder affecting 1:110 children in the United States (CDC, 2009). Evidence supports large heritable contributions to the etiology of ASD, though environmental factors are likely to modify both the development and the course of ASD. Prenatal nutrient-environment interactions are unstudied in relation to autism etiology and risk. The objective of this study is to examine interaction effects between maternal supplemental nutrient intake and pyrethroid pesticides in relation to ASD.

Methods: Northern California families were enrolled from 2003-2009 in the population-based case-control CHARGE (Childhood Autism Risks from Genetics and the Environment) Study. Children aged 24-60 months were evaluated and confirmed to have autism (n=288), autism spectrum disorder (n=141), or typical development (n=278) at the M.I.N.D. Institute using standardized clinical assessments. Maternal prenatal vitamin intake before and during pregnancy and use of products containing pyrethroid pesticides were retrospectively collected through telephone interviews. Adjusted odds ratios (OR) were estimated for associations between ASD and combinations of prenatal vitamin and pyrethroid pesticide exposure.

Results: Estimated risk for having a child with autism when mothers did not take a prenatal vitamin and were exposed to pyrethroid pesticides during pregnancy (OR=5.4, 95% CI: 2.4-11.9) was over twice what was expected for that combination by either an additive (OR=2.2) or multiplicative model (OR=2.6). Though still significantly elevated, the observed risk for having a child with ASD associated with pyrethroid exposure during pregnancy was much lower if the mother reported taking a prenatal vitamin during the period around conception (OR=1.7, 95% CI: 1.0-2.8).

Conclusions: These findings suggest that vitamin supplements taken before or early in pregnancy could potentially reduce the risk of ASD associated with pyrethroid pesticides. Further studies are warranted.

References:

CDC (Centers for Disease Control and Prevention). Prevalence of autism spectrum disorders---Autism and Developmental Disabilities Monitoring Network, six sites, United States, 2006. In: Surveillance Summaries, December 18, 2009. MMWR 2009;58(No. SS10):1-20.